

Claims

1. Rewinding machine to produce logs of web material (N), comprising:

- a winding cradle (7);
- an insertion member (29) to insert winding cores (A, A1) into said cradle;
- an ejector (39) to eject the logs formed from said cradle (7) causing them to roll on an unloading chute (41);
- a severing device (55, 53) to sever the web material after the log is ejected from said cradle;

10 **characterized in that:**

- disposed along the unloading chute is an aperture (43) elongated in a direction transverse to the direction in which the log is unloaded along said unloading chute;
- and said severing device (53, 55) comprises a movable element (55) that is inserted into said aperture (43) to cause severing of the web material between the cradle and the finished log.

15 2. Rewinding machine as claimed in claim 1, characterized in that said severing device also comprises a blade (53) applied along said aperture (43) with which said movable element (55) cooperates.

20 3. Rewinding machine as claimed in claim 2, characterized in that said blade (53) is fitted along the edge of said aperture disposed downstream with respect to a movement to unload the log on said chute (41).

4. Rewinding machine as claimed in claim 2 or 3, characterized in that said blade (53) is serrated.

25 5. Rewinding machine as claimed in one or more of the previous claims, characterized in that a first glue container (45) is disposed underneath said chute (41) and in that a first movable dispensing member (47, 49) that collects the glue from said first container (45) to apply it to the finished log is associated with said first glue container.

30 6. Rewinding machine as claimed in claim 5, characterized in that it comprises rewinding means (61, 63) to wind the trailing edge of the log after the glue has been applied.

7. Rewinding machine as claimed in claim 6, characterized in that said rewinding means define a stop position of the log ejected onto said

unloading chute (41), the glue being applied to the log when it is in said stop position.

8. Rewinding machine as claimed in claim 5, characterized in that the width of said aperture, in the direction in which said logs are unloaded, is such
5 that when the movable element (55) of the severing device is in said aperture, said first movable dispensing member (47) can pass through said aperture.

9. Rewinding machine as claimed in one or more of claims 5 to 8, characterized in that said movable element (55) is carried by a pair of oscillating arms (11).

10 10. Rewinding machine as claimed in claim 9, characterized in that said pair of oscillating arms (11) support a winding roller (13) with movable axis.

11. Rewinding machine as claimed in one or more of the previous claims, characterized in that a second glue container (71) is disposed underneath said cradle (7) and in that a second movable dispensing member
15 (73, 75), to apply a glue to the winding cores when they are in said cradle, is associated with said second glue container.

12. Rewinding machine as claimed in one or more of the previous claims, characterized in that an insertion surface (23) for the winding cores (A, A1) is disposed on the opposed side of said cradle with respect to the unloading
20 chute (41), said insertion member (29) pushing the winding cores along said insertion surface (23) towards said cradle.

13. Rewinding machine as claimed in one or more of the previous claims, characterized in that said ejector (39) and said insertion member (29) are integral with each other.

25 14. Rewinding machine as claimed in claim 12 or 13, characterized in that said insertion member (29) is provided with a translatory movement.

15. Rewinding machine as claimed in at least claims 12 and 13, characterized in that: said ejector comprises a pair of sides (31) between which a pusher section extends to eject the finished logs from said cradle (7), and with
30 which the insertion member (101) is integral, the ejector and the insertion member being spaced from each other in the direction of the movement to insert the cores and to eject the logs, and in that means to feed the cores are provided to position said cores in an intermediate position between the insertion member and the ejector.

16. Rewinding machine as claimed in claim 15, characterized in that said means to feed the cores comprise a channel (27) to drop the cores, defining an insertion trajectory orthogonal to the axis of said cores.

5 17. Rewinding machine as claimed in claim 15 or 16, characterized in that said means to feed the cores comprise a conveyor (25) that inserts said cores with a movement parallel to the axis of said cores.

18. Rewinding machine as claimed in claim 17, characterized in that said conveyor comprises a belt conveyor.

10 19. Rewinding machine as claimed in at least claim 5, characterized in that said first movable dispensing member (47, 49) comprises an elongated member (47) provided with an oscillating movement.

20. Rewinding machine as claimed in at least claim 11, characterized in that said second movable dispensing member (73, 75) comprises an elongated member (73) provided with an oscillating movement.

15 21. Rewinding machine as claimed in at least claim 6, characterized in that said rewinding means include a pair of rewinding rollers (61, 63).

22. Rewinding machine as claimed in claim 21, characterized in that a first of said rewinding rollers is supported by a pair of oscillating arms (65) to be carried from an active position to a disabled position.

20 23. Rewinding machine as claimed in claim 22, characterized in that a conveyor (67) is disposed between the disabled position of said first rewinding roller (61) and the second of said two rewinding rollers to move the finished logs away in a direction parallel to their axis.

25 24. Rewinding machine as claimed in one or more of the previous claims, characterized in that it comprises a plurality of cutting knives (83) to cut the web material along longitudinal cutting lines, cooperating with respective counter-blades (91) constituted by a plurality of annular channels (89) produced on a counter-roller (87).

30 25. Rewinding machine as claimed in claim 24, characterized in that it comprises a series of ply-bonding members (93), cooperating with said counter-roller (87).

26. Rewinding machine as claimed in one or more of the previous claims, characterized in that said winding cradle (7) is formed of a pair of winding rollers (3, 5).

27. Rewinding machine according to one or more of claims 1, 5-26, characterized in that said movable element (55) includes a rigid member (58) and resilient pressing side members (56).

5 28. Rewinding machine according at least to claim 5, characterized in that said first glue container (45) is arranged underneath said aperture (43).

29. Rewinding machine according to claim 5 or 28, characterized in that said movable dispensing member (47, 49) moves from said first glue container (45) towards said log (R) passing through said aperture (43) into which said movable element (55) enters to sever the web material (N).

10 30. Rewinding machine according to claim 5 or 28, characterized in that along said chute (41) a second aperture (43A) is provided, arranged parallel to said aperture (43) into which said movable element (55) enters to sever said web material, said second aperture (43A) providing a passage for said first movable glue dispensing member (47, 49).

15 31. Rewinding machine according to one or more of claims 1-9, 11-30, characterized in that said movable element (55) is carried by a pair of oscillating arms (11) and that a further pair of oscillating arms (11A) is provided, carrying a third winding roller (13).

20 32. Method to produce logs of web material, comprising the phases of:
- inserting at least a first winding core into a winding cradle (7);
- winding a pre-established quantity of web material (N) around said at least one first winding core (A, A1) to form a log (R);
- unloading the formed log from said winding cradle (7) along an unloading chute (41);
25 - inserting at least one second winding core (A1) into said cradle (7);
- severing the web material between said log (R) and said at least one second winding core (A1) by means of a severing device;

characterized in that:

30 - disposed along said unloading chute is an aperture (43), elongated in a direction transverse to the direction in which the log is unloaded along said chute;
- and said web material is severed by a movable element (55) of said severing device, inserting said movable element into said aperture.

33. Method as claimed in claim 32, characterized in that said movable

element (55) cooperates with a blade (53) fitted along said aperture (43) to sever the web material.

34. Method as claimed in claim 32 or 33, characterized in that a movable winding roller (13) is brought into contact with said second core.

5 35. Method as claimed in claim 34, characterized in that said movable element is moved in said aperture to sever the web material simultaneously to said roller (13) when it is brought into contact with the second core.

10 36. Method as claimed in one or more of claims 32 to 35, characterized in that a first glue container (45) is disposed underneath said aperture (43); and in that a glue is applied to the log unloaded onto said unloading chute by a first movable dispensing member (47) which collects the glue from said first container.

15 37. Method as claimed in one or more of claims 32 to 36, characterized in that a glue is applied to said second core when it is in the winding cradle.

38. Method as claimed in claim 37, characterized in that said glue is applied to the second core (A1) during severing of the web material.

20 39. Method as claimed in claims 37 or 38, characterized in that the glue is applied to the second core by means of a second movable dispensing member (73, 75) that collects glue from a second glue container (71) disposed underneath said winding cradle.

25 40. Method as claimed in one or more of claims 32 to 39, characterized in that said second core (A1) is disposed at an insertion surface (23) positioned, with respect to the winding cradle, on the opposed side of said unloading chute (41), before unloading the formed log from the cradle.

41. Method as claimed in one or more of claims 32 to 40, characterized in that the formed log is unloaded from said cradle and said second core is inserted into said cradle by means of an ejector and an insertion member integral with each other.

30 42. Method as claimed in one or more of claims 32 to 41, characterized in that: said web material is formed of at least two plies; in that said at least two plies are bonded together by ply-bonding; and in that the web material is divided into a plurality of longitudinal strips before winding.

43. Method as claimed in claim 42, characterized in that said at least

two plies are bonded and the web material is cut by a series of ply-bonding members (93) and a series of cutting knives (83) cooperating with a single counter-roller (87), which is provided with annular grooves (89) forming counter-blades for said cutting knives, separated from one another by annular projections (91) at least some of which cooperate with said gripping members (93).

44. Method according to claim one or more of claims 32, 34-43, characterized by retaining said web material during cutting by pressing it near the edges of said aperture.